

the manufacturing system, and, if the program performs according to a preselected criterion, a revised status identifier is designated.

[0012] Another aspect of the present invention is directed to a computer data structure for use in identifying programs for computer-controlled manufacturing systems. In an embodiment of this aspect of the invention, the programs comprise subsets organized with respect to one another in a hierarchical fashion, the subsets comprising a top-level subset and a plurality of lower-level subsets related hierarchically to the top-level subsets and to each other. A first portion indicates a revision to the top-level subset of the program, and a second portion indicates a revision to any of the lower-level subsets of the program. A method for completing the data structure is disclosed where, in a first portion for indicating a revision to the top-level subset of a program, a first symbol is inserted to indicate that such a revision has been made, and similarly, in a second portion for indicating a revision to the top-level subset of the program, a second symbol is inserted to indicate that such a revision has been made.

[0013] In another aspect of the present invention, a computer-implemented method for managing revision to a program used in the control of a manufacturing system is taught. The method involves identifying that a revision has been made to the program; identifying whether the program, as revised, satisfies a preselected criterion; if the program, as revised, satisfies the preselected criterion, automatically selecting a version designator

according to a preselected scheme; and automatically associating the selected version designator with the program code.

[0014] In addition, methods for managing revisions to a program used in the control of manufacturing system supervised by at least one operator, and in the control of plurality of manufacturing lines, are disclosed. In the former method, the manufacturing system is in communication over a network with a server coupled to a database containing the program, the manufacturing system and the server also in communication over the network with at least one client device, the at least one client device permitting communication with the server by a person authorized to do so in order to access the program, the program also being accessible via the server by the at least one operator through an interface associated with the manufacturing system. The occurrence of a revision to the program is detected over the network, and a determination is made as to whether the revision to the program was made by a particular one of the at least one authorized person. If the revision was not made by a particular one of the at least one authorized person, a message is sent over the network from the server to a client device to notify the particular person that the revision was made.

[0015] In the latter method, a version of a program is downloaded to the manufacturing system for testing the program associated with a status identifier, where the program relates to an article of manufacture that may be represented graphically based on information in the program. Then a request

is received to compare a first version of the program associated with a first status identifier with a second version of the program associated with a second status identifier, the first and second status identifiers assigned upon release of the respective versions for use on the plurality of manufacturing lines. Next, the program versions associated with the first and second status identifiers are retrieved, the program versions are compared to identify a set of differences, and the differences are displayed having a visual characteristic that contrasts with the representation of the article graphically.

[0016] Accordingly, the present invention provides a computer-implemented method for managing revisions to a program used in the control of manufacturing systems. This is accomplished by providing a two-part data structure for revision/version management; a method for completing a two-part data structure; a method for managing revisions involving automatically assigning a version identifier under preselected conditions; a method for managing revision involving automatic notification of personnel with a need to know of the change; and a method for managing revision involving a revision compare function. An object of the present invention is to reduce wasted time and parts, and hence improve productivity on the manufacturing line. Other objects and advantages will be apparent to those skilled in the art in view of the following description.

BRIEF DESCRIPTION OF THE DRAWINGS